

Preface

For over 20 years, academic and industry researchers have focused on the ease of use (or usability) of computer systems. This field, also known as human-computer interaction and human factors engineering, has evolved and grown from humble beginnings to the point where its significance is widely appreciated in the world of information technology, and its role has become critical in a highly competitive business marketplace.

IBM has been one of the leaders in the development of this field from its inception. IBM's User-Centered Design (UCD) approach began as a small pilot project and developed into a company-wide fundamental element in the design process for all IBM product offerings under the guidance of Lou Gerstner. UCD has become an industry standard for building usability into the design of IT products.

UCD is more than a paradigm for designing usable products and systems. It is a blueprint for the practical implementation of product and system design, encompassing all aspects of the design process, from the gathering of user requirements during the early conception of a product through all aspects of the product cycle, including testing, product shipment, and beyond. Chief among its principles is that of the centrality of the user and his or her requirements, goals, tasks, and preferences, in guiding the large and small details of product design.

Product development does not take place in a vacuum; a carefully designed user-centered product offering that garners little market share is not a success. Cognizant of critical marketplace considerations, IBM has expanded the focus of UCD, which is user-driven, to create User Engineering (UE), which is business value-driven. UE incorporates the

principles of UCD and goes beyond them, transforming the design process in order to meet business and market requirements as well as user requirements.

UE is critical in the implementation of two aspects of IBM's e-business on demand strategy: autonomic computing and integration. Integration ensures that products can be integrated with others that are likely to be used together with them, and UE is required to achieve this goal. UE is also required in the collection and analysis of information from representative users to determine what to automate, and in the design of the automation itself.

A fundamental principle of UCD and UE involves the coordination, communication, and collaboration of disparate elements of the product design team. With the complexity of many IT products and systems, the user's experience can suffer if the solution that is delivered works well on the individual component level but does not have the look, feel, and function of an integrated unit. UCD and UE address this issue by guiding the development of a design team (including system architects, visual designers, marketing specialists, user research specialists, and others) which works closely together towards a single goal and product conception. The *total user experience* is thus the object of UCD and UE's focus, and the success of a product is evaluated accordingly.

The design process embodied by UCD and UE is iterative: products are tested continually throughout the design process (in contrast with industry practice before UCD), and user input and feedback is paramount in guiding the redesign and reengineering of products and systems. A product that is free of defects but difficult for users to purchase, learn, or use on a day-to-day basis is not acceptable; user eval

uations are critical in guiding the development of products before their release and subsequent to it.

Just as the UCD and UE design processes are iterative, so are UCD and UE themselves, changing to meet the changing needs and conditions of the information technology marketplace. This issue of the *IBM Systems Journal* traces the development and evolution of UCD and UE, provides case studies illustrating the critical role UCD and UE have played in the development of IBM products and solutions, and predicts how our focus on ease of use will affect products currently being designed and those not yet conceived. Included are 13 papers on process, methods, techniques, and research studies related to UCD and UE and two book reviews.

The first paper of the issue, "Building ease of use into the IBM user experience," provides an overview of UCD and UE and the process and organizational transformation IBM experienced in incorporating them as critical elements in the design process. A synopsis of the other papers in this issue is also included.

It is our hope that this issue will be informative and instructive to those interested in the role of ease of use in IBM's overall strategy and in examples of its implementation.

The next issue of the *Journal* is devoted to Utility Computing.

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